D McTavish

OPERATING SUMMARY

Ontario Water Resources Commission
Divsion of Plant Operations.

WATERDOWN

water pollution control plant

1968

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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 7
Ontario

We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.

D Caverly
D. S. Caverly,
General Manager.

DMcTavish
D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

WATERDOWN

water pollution control plant

operated for the

TOWN OF WATERDOWN

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

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135 St. Clair Avenue West,
Toronto 7

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

CONTENTS

Title Page i

Foreword ii

'68 Review 1

Project Costs 2

Operating Costs 3

Process Data 5

Conclusions . . . . Inside back cover

'68 REVIEW

A total of 21. 22 million gallons of raw sewage, far below design capacity, was treated at the Waterdown plant in 1968. The total operating cost for the year was $12,065. 26, a decrease of $1,519. 89 from 1967. The operating cost per million gallons of raw sewage was $568. 58 as opposed to $620. 33 in 1967.

Plant removal efficiency averaged 95% for BOD and 96% for suspended solids.

Following the resignation of R. Skewes as chief operator, the plant was operated as a satellite of the OWRC Burlington project, and this was the major factor in reducing the operating costs. All time spent by Burlington staff in Waterdown was charged to the Waterdown operating account and a credit made to the Burlington account.

PROJECT COSTS

NET CAPITAL COST (Final)		$475,418.08
DEDUCT - Payments from Municipalities	$119,885.79	
- Portion Financed by CMHC-MDLB (Final)	140,977.13	260,862.92
Long Term Debt to OWRC		$214,555.16
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968		$ 15,055.98
Net Operating		$ 12,065.26
Debt Retirement		4,330.00
Reserve		2,878.51
Interest Charged		12,045.86
TOTAL		$ 31,319.63

RESERVE ACCOUNT

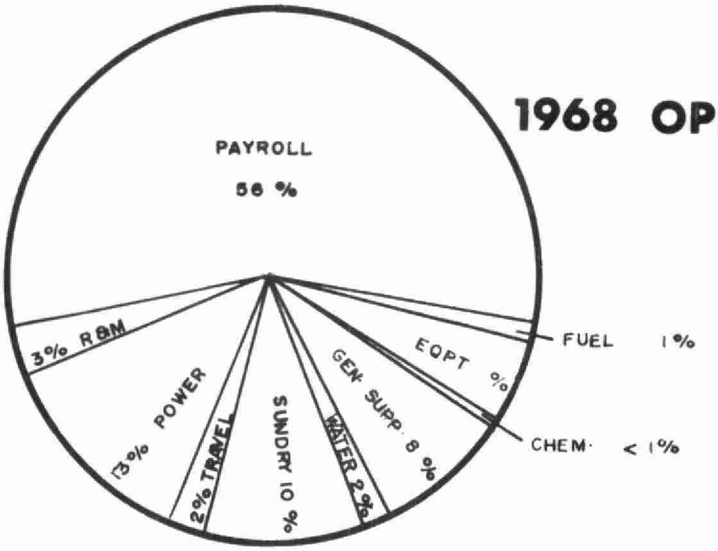
Balance at January 1, 1968	$ 6,505.49
Deposited by Municipality	2,878.51
Interest Earned	408.80
	$ 9,792.80
Less Expenditures	1,099.67
Balance at December 31, 1968	$ 8,693.13

Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAY ROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	677.10	523.78	-	-	115.34	-	37.98	-	-	-	-	-
FEB	1264.54	457.27	25.20	-	113.81	-	80.47	291.52	-	71.99	165.50	38.78
MAR	1405.19	757.05	107.84	68.60	130.31	-	90.91	12.44	121.22	98.34	-	18.48
APRIL	901.45	477.40	21.00	-	115.04	-	129.23	-	63.85	87.97	(18.45)	25.41
MAY	899.23	473.39	-	43.07	117.48	-	116.03	-	21.00	116.99	-	11.27
JUNE	938.71	471.89	-	-	118.14	-	83.34	154.52	-	98.50	-	12.32
JULY	1423.99	827.50	-	22.14	115.17	4.38	134.16	-	143.25	113.15	-	44.24
AUG	1325.09	1048.01	-	-	127.70	9.22	13.60	-	-	108.22	-	18.34
SEPT	890.98	558.41	-	-	163.25	-	69.83	-	-	66.82	6.00	26.67
OCT	734.23	296.43	-	-	159.58	-	83.29	146.04	-	41.40	-	7.49
NOV	881.83	327.25	-	35.77	153.93	-	53.60	-	63.00	212.33	10.60	25.35
DEC	722.92	347.19	-	-	158.48	-	25.18	-	-	159.97	12.00	20.10
TOTAL	12065.26	6565.57	154.04	169.58	1608.23	13.60	917.62	604.52	412.32	1195.68	175.65	248.45

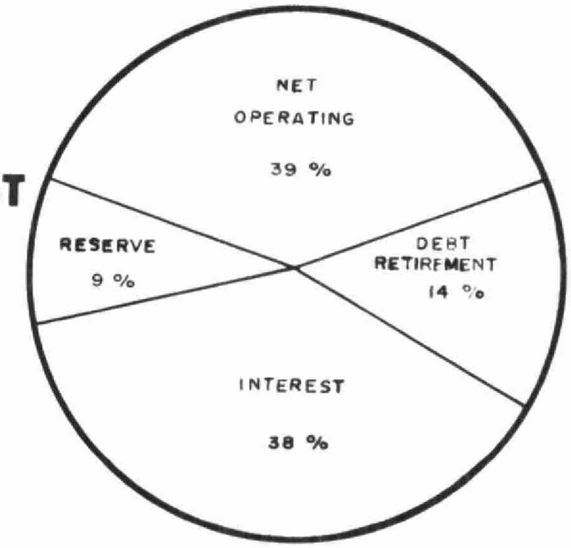
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $732.82

BRACKETS INDICATE CREDIT



1968 OPERATING COSTS

TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G.TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1967	21.90	$13,585.15	$620.33	30 cents
1968	21.22	12,065.26	568.58	23 cents

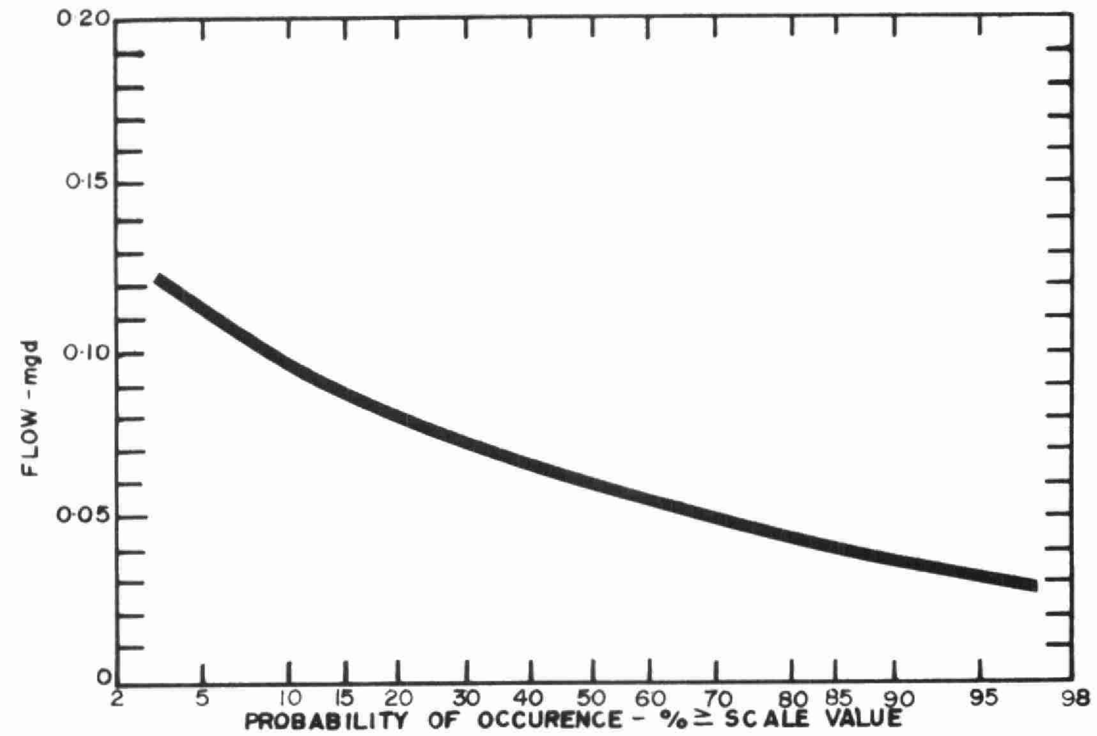
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED lbs.	DOSAGE mg/l
JAN	1.52	.05	.12	.02	97	9.8
FEB	1.92	.07	.32	.02	59	6.8
MAR	2.22	.07	.17	.007	45	2.0
APR	1.87	.06	.11	.02	171	9.1
MAY	1.69	.05	.08	.02	128	7.6
JUN	1.62	.05	.15	.03	68	4.2
JUL	1.08	.04	.06	.02	116*	13.2
AUG	2.27	.07	.93	.02	117	5.1
SEPT	1.44	.05	.08	.03	81	5.6
OCT	1.38	.04	.06	.03	85	6.2
NOV	2.01	.07	.27	.03	321	15.9
DEC	2.20	.07	.17	.03	99	4.5
TOTAL	21.22	-	-	-	1387	-
AVERAGE	-	.05	-	-	116	6.5

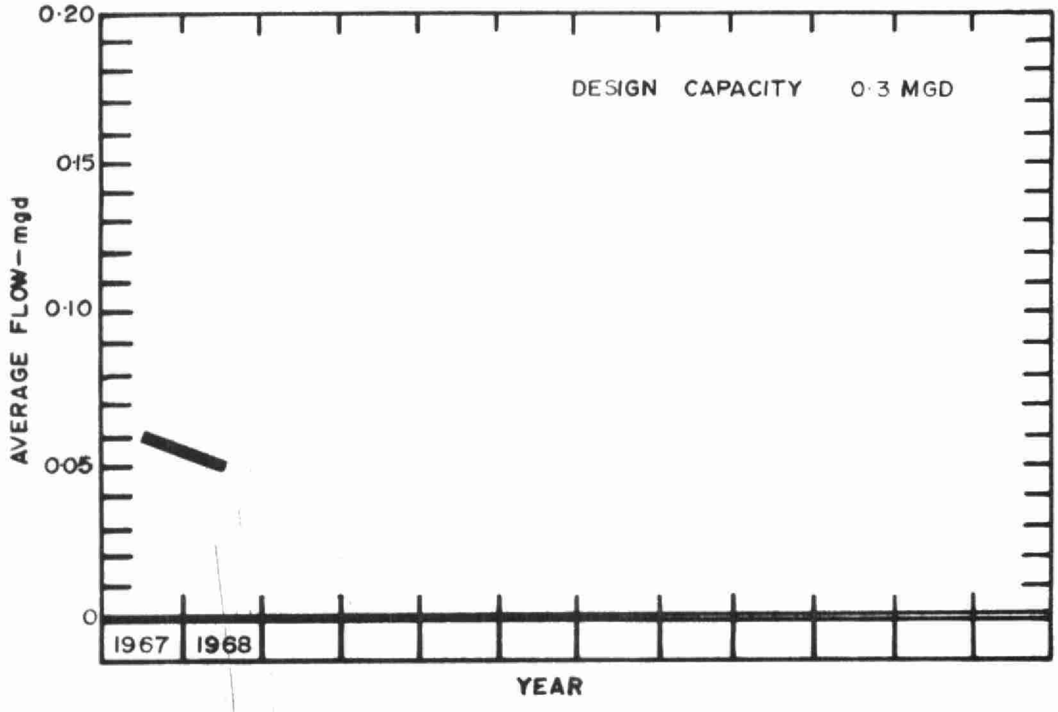
* Chlorination - 25 days

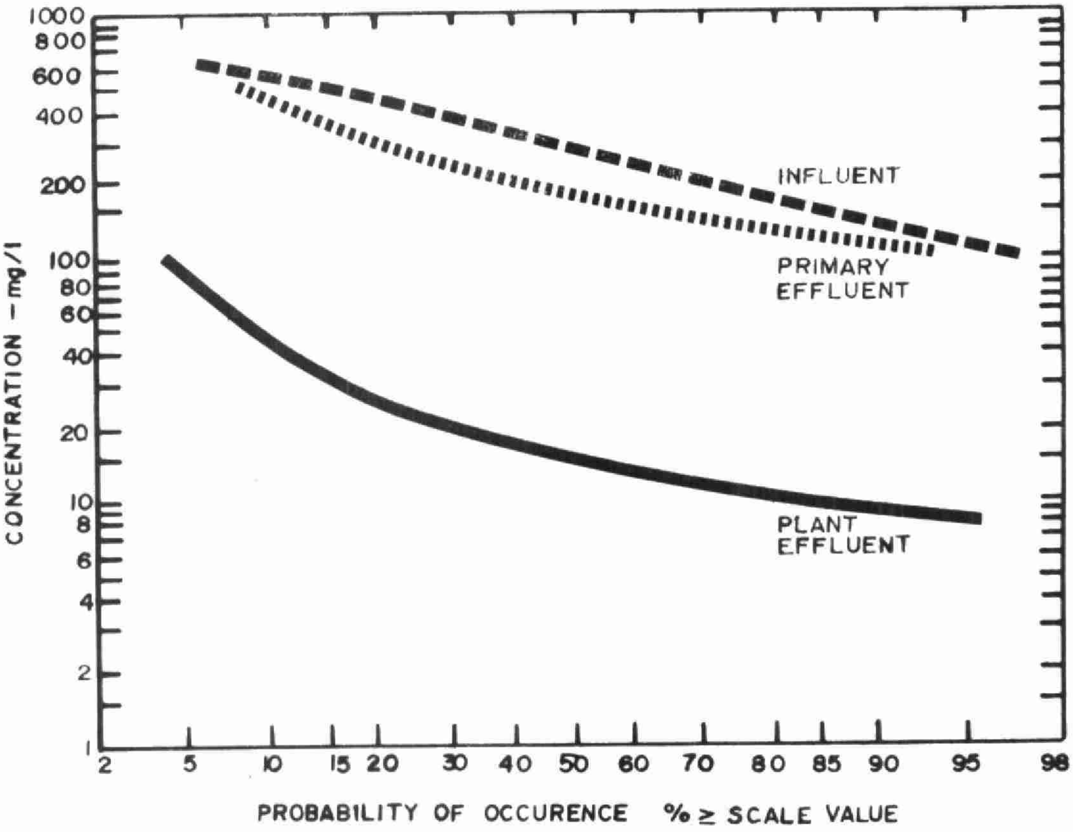
COMMENTS

Chlorine is added to disinfect the final effluent. A minimum residual of 0.5 mg/l is maintained after 15 minutes' retention.

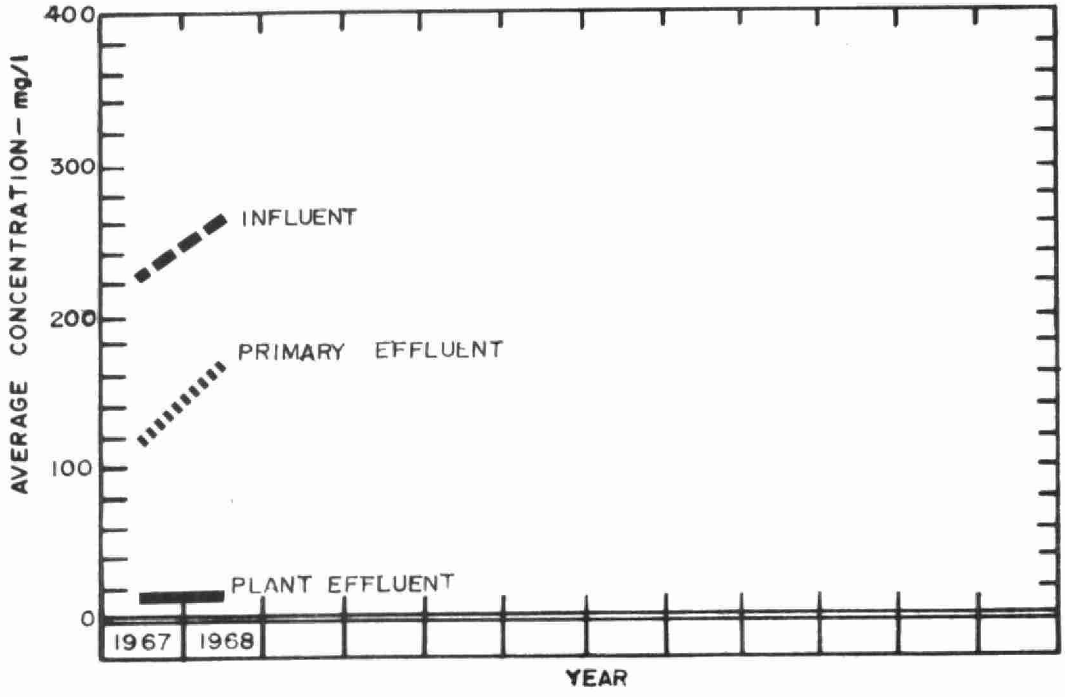

0·20
0·15
0·10
0·05
0
FLOW - mgd
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

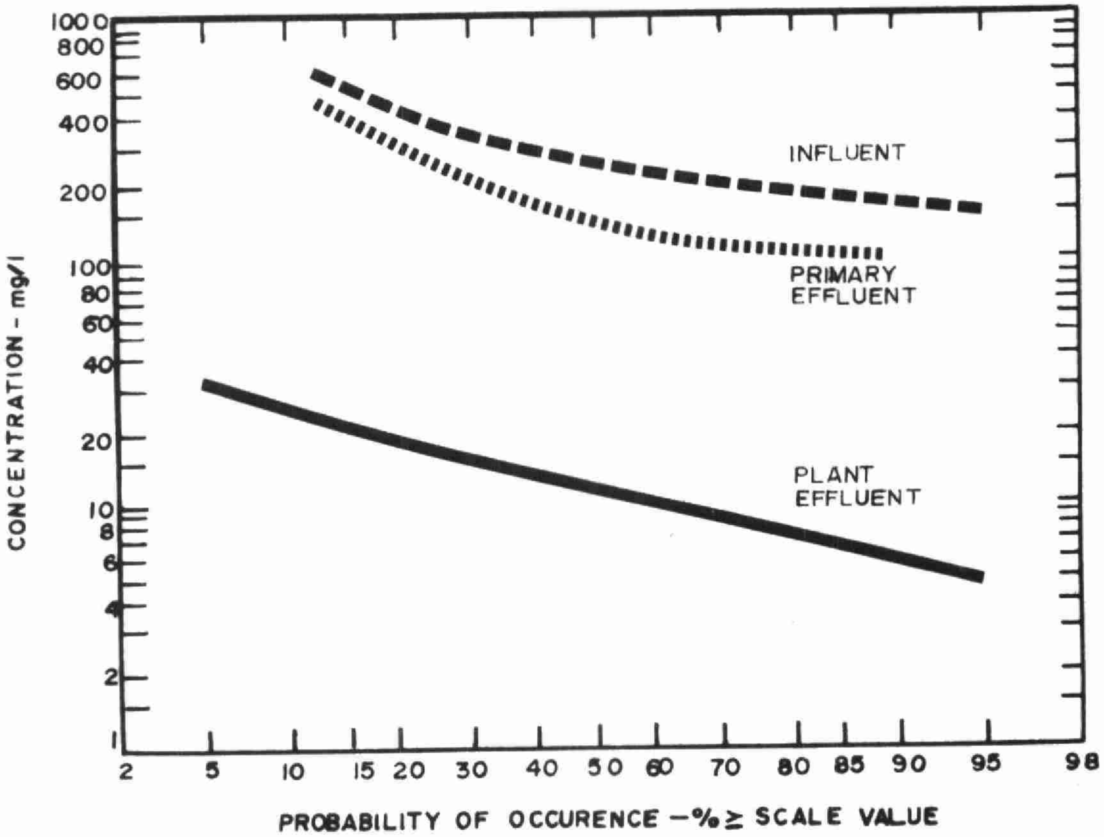
FLOWS


0·20
0·15
0·10
0·05
0
AVERAGE FLOW - mgd
DESIGN CAPACITY 0·3 MGD
1967
1968
YEAR

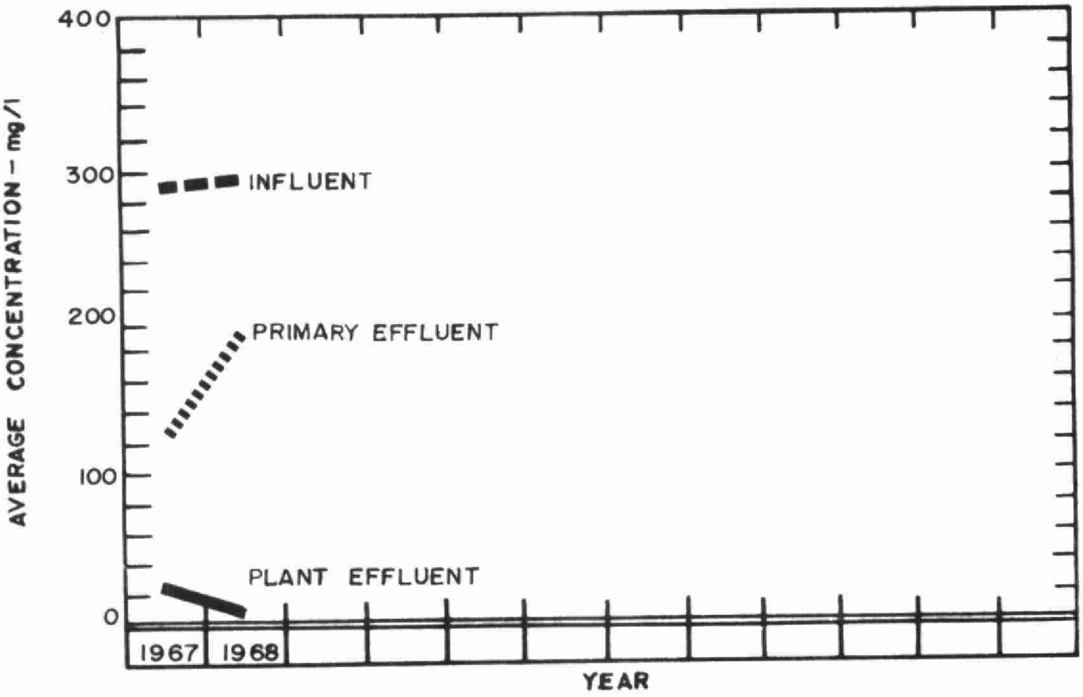


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
	INF CONC^N mg/l	EFF CONC^N mg/l	RED^N %	REMOVAL 10^3 lb	INF CONC^N mg/l	EFF CONC^N mg/l	RED^N %	REMOVAL 10^3 lb	REMOVAL ft^3
JAN	263	35	87	3.48	477	18	96	7.00	7
FEB	165	22	87	2.74	222	11	95	4.04	7
MAR	-	-	-	-	-	-	-	-	-
APR	175	9	95	3.11	124	6	95	2.20	10
MAY	140	7	95	2.24	228	3	99	3.79	11
JUN	480	5	99	7.69	459	5	99	7.31	11
JULY	320	5	90	3.40	299	8	97	3.14	21
AUG	330	4	99	7.41	542	18	97	11.92	43
SEPT	-	-	-	-	-	-	-	-	-
OCT	350	26	93	4.46	241	13	95	3.14	9
NOV	262	9	97	5.09	248	7	97	4.84	27
DEC	138	16	88	2.68	140	17	88	2.70	11
TOTAL	-	-	-	-	-	-	-	-	177
AVERAGE	262	14	95	4.2	298	11	96	5.0	15

COMMENTS

The average strength of raw sewage was 262 mg/l BOD and 298 mg/l suspended solids. The average effluent quality of 14 mg/l BOD and 11 mg/l suspended solids was within OWRC objectives. This was an improvement over the 1967 results of 17 mg/l BOD and 22 mg/l suspended solids.

The final effluent was impaired for short periods during the year, when return sludge facilities were plugged with debris thrown into tanks by vandals. Similar difficulties occurred when heavy rain storms caused very high hydraulic loading.

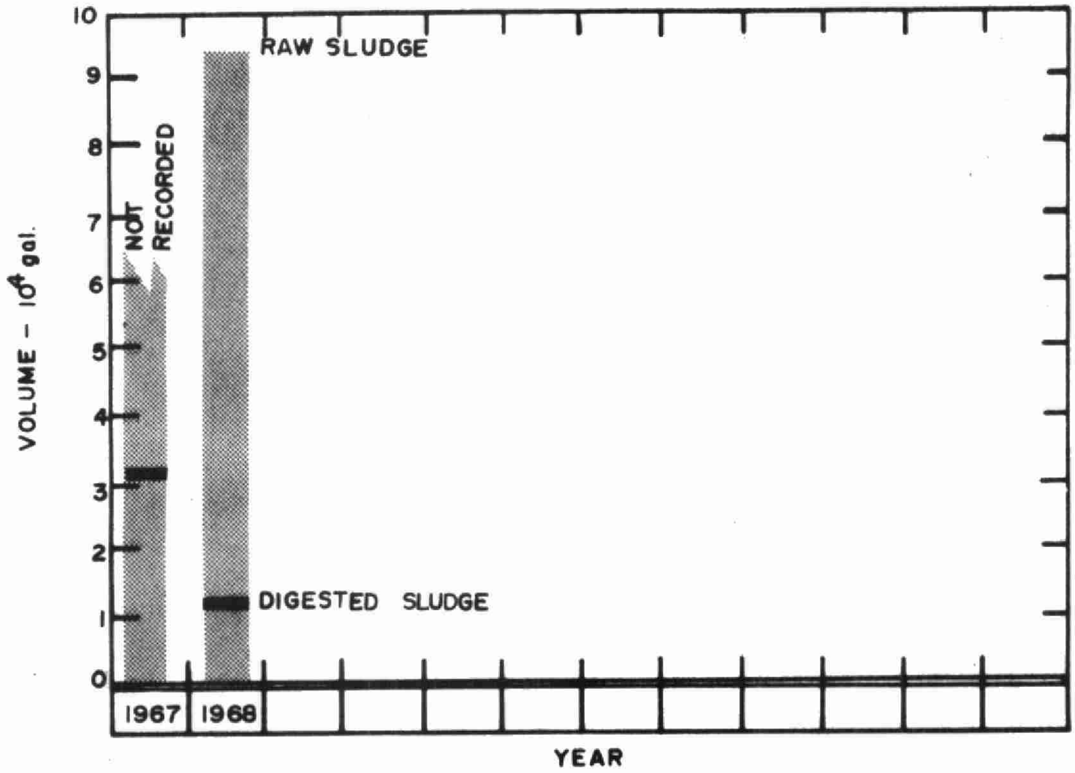
AERATION

MONTH	AVERAGE FLOW mgd	PRIMARY EFF		SECONDARY EFF		ML SS CONC^{N} mg/l	F/M (lb BOD / lb MLSS)	AIR USED (1000 ft^{3} / lb BOD REMOVED)	WASTE SLUDGE lb
		BOD CONC^{N} mg/l	SS CONC^{N} mg/l	BOD CONC^{N} mg/l	SS CONC^{N} mg/l				
JAN	.05	125	140	35	18	2,050	.006	-	-
FEB	.07	94	96	22	11	1,860	.007	-	-
MAR	.07	-	-	-	-	1,400	-	-	-
APRIL	.06	125	105	9	6	3,140	.005	-	-
MAY	.05	96	149	7	3	1,670	.006	-	-
JUN	.05	145	119	5	5	1,850	.009	-	-
JUL	.04	129	117	5	8	1,270	.007	-	-
AUG	.07	64	97	4	18	1,980	.005	-	-
SEPT	.05	-	-	-	-	1,750	-	-	-
OCT	.04	285	122	25	13	1,870	.01	-	-
NOV	.07	466	756	9	7	2,101	.03	-	-
DEC	.07	111	198	16	17	850	.02	-	-
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	.05	164	190	14	11	1,810	.011	-	-

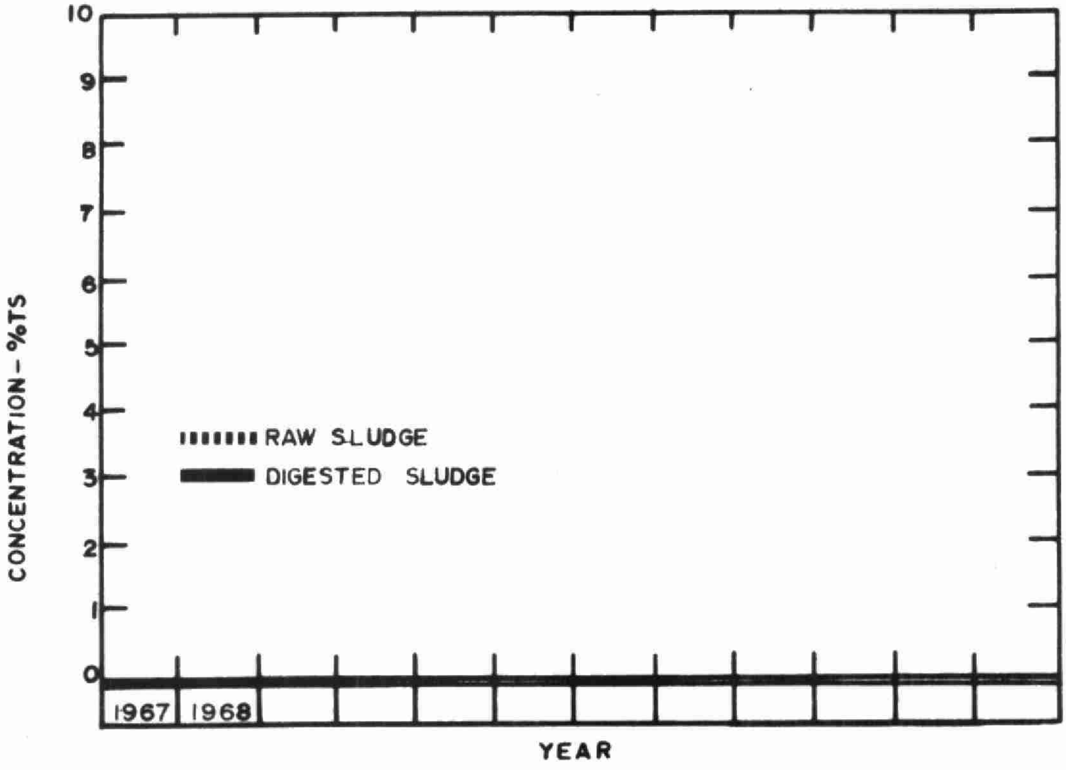
COMMENTS

A 37% removal efficiency for BOD and 36% for suspended solids was achieved in the primary clarification process.

The aeration section organic loading of 1.1 lbs. of BOD to 100 lbs. of mixed liquor suspended solids is very low, and is due to low raw sewage flows. The speed on one blower has been reduced to lower operating costs.


VOLUME - 10⁴ gal.
10
9
8
7
6
5
4
3
2
1
0
RAW SLUDGE
NOT RECORDED
DIGESTED SLUDGE
1967
1968
YEAR

DIGESTION


CONCENTRATION - %TS
10
9
8
7
6
5
4
3
2
1
0
RAW SLUDGE
DIGESTED SLUDGE
1967
1968
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^3 gal	T.S. %	V.S. %	VOLUME 10^3 gal	T.S. %	V.S. %	VOLUME gal	T.S. %	LIQUID yd^3	DEWATERED yd^3
JAN	–	3.6	74	17.4	3.0	70	–	–	103	0
FEB	9.3	–	–	9.7	–	–	–	–	58	0
MAR	10.5	–	–	12.2	–	–	–	–	73	0
APR	7.8	–	–	8.8	–	–	–	–	56	0
MAY	10.6	–	–	15.6	–	–	–	–	93	0
JUN	12.9	–	–	11.7	–	–	–	–	72	0
JUL	9.6	3.8	50	15.6	–	–	–	–	92	0
AUG	5.4	–	–	5.9	–	–	–	–	35	0
SEPT	2.9	–	–	3.9	–	–	–	–	23	0
OCT	8.0	–	–	7.8	–	–	–	–	46	0
NOV	10.4	3.0	75	7.8	–	–	–	–	46	0
DEC	7.3	–	–	7.6	–	–	–	–	44	0
TOTAL	94.7	–	–	12.40	–	–	–	–	741	0
AVERAGE	8.6	3.5	66	1.03	3.0	70	–	–	62	0

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CONCLUSIONS

The average daily flow was 17% of the design dry weather flow, resulting in abnormally high treatment costs per million gallons. Plant effluent was satisfactory and improved over 1967. Abnormally high storm flows caused considerable concern and were discussed with municipal representatives.

RECOMMENDATIONS

The municipality should under
connections to the sanitary sew
filtration during storms.

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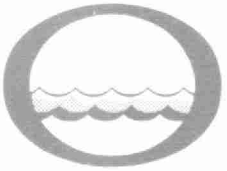

Water management in Ontario